

SECTION N, PART 0

SUBSCRIBERS LINE TEST, CLASS OF TEST

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NO SUBSCRIBER LINE TEST - CLASS OF TEST - GENERAL

The line test class of test is used to set up a connector from the master test frame voltmeter test circuit to any line to be tested. The master test control circuit simulates a no-hunt incoming trunk that has an appearance on a trunk link. The master test control also simulates an incoming register and extends the trunk to the master test frame voltmeter test circuit where tests for talking, ringing, foreign potentials, capacity tests, receiver off-hook tone and continuity tests may be made.

NO-1 TEST FRAME SET UP WITH CLASS-OF-TEST CHART

The class-of-test table summarizes in tabular form the key(s) and switch(es) used to establish an LT class of trunk test on the chart. A single line across all columns is used to separate a particular function with its associated figure, option, key, or switch. The double line within the single lines is used to separate the various options on vintages of master test control frames. The note column and sheet notes are as follows:

- (a) Note 1 indicates that all key(s) or switch(es) must be operated to make a proper test frame set up for this particular class of test.
- (b) Note 2 indicates the key(s) or switch(es) to be used to simulate the trouble record. Refer to simulation tables in SFD-D902, D904, or D906 and their associated colored trouble record card on the opposite pages D903, D905, or D907) or the simulated table selected. The tables and colored trouble record cards, along with the class of test tables, will assist the maintenance personnel in selecting the proper key(s) or switch(es) to be operated in order to properly simulate the reported trouble condition.
- (c) Note 3 indicates those key(s) or switch(es) used for additional marker tests, but they are not required for the trouble record test or a simulation test.

NO-2 SEQUENCE CHART - LT CLASS (N004)

The sequence chart for the LT class of trunk test is a combination of a sequence chart and a flowchart. It is designed to show the main functional interactions between the Master Test Control (MTC) circuit, the Trunk Test (TT) circuit, the Master Test Frame Connector (MTFC)

circuit and the Completing Marker (CM). Each double line box represents a particular circuit. The section and part of the SFD which provides full detail for the function is indicated within the box.

The overall progress of a subscriber line test is depicted by the flow from one functional box to the next. Within each box are skeletonized sequence chart depiction of the major progress points and information flow. In addition the keys and switches which are set up for the class of call are shown. The primary use of this chart is to show this overall progress of the call with key points of detail. It can be used to isolate a general trouble area if the test call fails in the set up stages.

NO-3 SUBSCRIBER LINE TEST - DESCRIPTION

Subscribers line tests use only special markers since they proceed on a no-hunt basis. The test circuit, which simulates a no-hunt incoming trunk and incoming register, primes the marker with the numerical digits of the line to be tested A(0-9) to D(0-9) and the office designations (OA, OAT, OB, OBT). The marker now attempts to set up a connection between the test circuit incoming trunk appearance on a trunk link frame to the line selected for test. The marker seizes the number group connector to find the line location of the subscribers line under test. After establishing the line location the marker proceeds to set up a connection through the linkage of the trunk link frame to the called line and to operate the hold magnet. The tip and ring of the selected line are now extended through the test circuit to the master test frame voltmeter test circuit.

NO-3.1 SUBSCRIBER LINE TEST CLASS OF TEST - PREPARATION

In preparation for the subscribers line test, the test employee must operate the keys and switches necessary to prime the marker to select the desired line. This is accomplished by operating the LT key for the class of test, selecting a special marker to set up the test connection, completing marker 0 or 1, and operating the A(0-9) - D(0-9) keys/switches for the desired lines digits and the OA, OB, OAT, OBT key for the office designation.

NO-3.2 START OF SUBSCRIBERS LINE TEST

With the Line Test (LT) key or switch operated, operation of the ST relay operates the LT relay. The LT relay operated lights the LT lamp, transfers the FA lead from the winding of the FB relay of the test circuit to the FA lead to the trunk link frame on which the test circuit has its incoming trunk appearance. Releasing the ST key removes the shunting

ground from the winding of the LT1 relay, allowing it to operate in series with the previously operated LT relay. The LT1 relay connects the tip and ring leads from the test circuit incoming trunk appearance on the trunk link frame to the master test frame voltmeter test circuit and operates the N1 relay. The operated N1 relay closes start battery to the master test frame connector MTP lead. The start battery operates a test preference relay (MTP-) which returns ground on the MKS lead. The MKS ground operates the MKT- (0 or 1) relay in the connector for the marker selected the MTFC makes the marker service busy and after verifying that the marker tests normal, operates a test relay in the marker and grounds the TS lead to the MTC circuit.

NO-3.3 OPERATE CONNECTING AND TEST RELAYS

The grounded TS lead from the MTFC operates the Test Start (TS) relay which in turn operates the TS(1-10) relays. At the same time, the TS relay in the MTFC operates the MT test relay in the selected marker. The MT in turn operates other MT- relays in the marker. Some of them will depend on the keys and switches which are operated for the test.

In addition various connecting relays which generally control input information into the marker will operate or will have operated by this time depending on the keys operated. A check path through contacts of these tests and connecting relays provides a ground to operate the MC relay of the MTC when all appropriate relays are operated. The MC in turn operates the MC1-8 relays. These relays cut through many of the leads to the MTC and also control additional connecting relays.

On the subscribers line test, class of test, the following relays are always operated: MT, MT1, MT11, MT13, MT15, MT17, MT18, MT27, MT29, MT56.

The operated LT key will operate the LT and LT1 relays. With the KY key operated, the K, and K1 relays will operate. The KA-KD relays will operate depending on the A-D digits used for the subscribers line. The KLT, KLT1 will be operated with the LT relay operated.

NO-3.4 INPUT INFORMATION TO MARKER

With the operated connecting and test relays, the marker is given various input information that it would normally receive from an IR such as trunk link frame number and incoming class. The master test frame supplies the directory number of the line to be tested and the office (A/B physical/theoretical). The KLT relay operated by the MC5 relay supplies the trunk link frame number on which the test frame has a trunk appearance. The KLT1 relay operated by the KLT provides the marker with the incoming class and grounds the INC lead to signal the marker it is handling an incoming class of call.

NO-3.5 SIMULATING FUNCTION OF INCOMING TRUNK

On an LT class of test, the test circuit incoming trunk appearance or a trunk link frame functions as a no hunt incoming trunk. The functions of a ringing switch are simulated. Lamps are provided which indicate the party, the ringing code of the line being tested, and if the line is connected for PBX hunting or free line service.

The KLT relay is operated by the MC5 relay and grounds the FG, TFA, and TFB punchings to furnish the number of the trunk link frame on which the test frame has a trunk appearance. When the marker applies battery to the F lead, the F relay of the test circuit operates to simulate the F relay of an incoming trunk. The F relay operated operates the FB relay at the appearance of the test trunk on the trunk line frame. The marker proceeds to set up a connection through the linkage of the trunk link frame to the called line and to operate the line hold magnet.

NO-3.6 SIMULATING FUNCTION OF RINGING SWITCH

The TC and RC relays of the MTC circuit simulate corresponding relays of an incoming trunk. When the marker grounds the TTC or RC leads, the TC or RC relays operate. The TC relay locks to ground on the back contact of the KR relay. The RC relay locks to the RSH relay operated.

The KRS relay is operated by the F relay and closes RS(0-9) leads from the marker to primary windings of the RS(0-9) relays which simulate ringing switch select magnets. The marker normally grounds the RS0 or RS1 lead and one of the RS(2-9) leads operating the corresponding relays which lock on secondary windings to ground on the operated RSM relay. Any of the RS(0-9) relays operated grounds the RSK lead to the marker. Lamps are lighted by the operated RS(0-9) relay to indicate the ringing condition which would normally be set up by a ringing switch, the marker having operated the RC relay, grounds the TP' lead to the RSH relay which operates simulating the operation of a ringing switch hold magnet.

NO-3.7 MARKER FUNCTION - ESTABLISHING NETWORK CONNECTION

The special marker used in the line test is primed with the office designation OA, OB, OAT, OBT, and the numerical digits A(0-9) - D(0-9) of the line to be tested. The operation of the KLTL relay grounds the INC lead to signal the marker it is handling on incoming TER class of call. The marker then proceeds to set up a connection from the test circuit incoming trunk appearance on a trunk link frame to the line to be tested. The marker through the number group connector seizes the number group to establish the line location of the line being tested. Once the line location is known, the marker through the line link connector operates the designated line hold magnet. We now have the tip and ring of the line under test closed through the test trunk appearance on the trunk link frame through the master test control voltmeter test circuit.

NO-3.8 MARKER RELEASE

When the marker has completed setting up the connection it grounds the DCT lead operating the DCT relay of the MTC which, with the REC key normal, operates the M01 relay to extend the DCT lead back to the marker to cause it to advance.

When the marker grounds the LK2 lead, the LK2 and DIS1 relay of the MTC are operated lighting the LK2 and DIS1 lamps. The marker grounds the MRL lead as a regular release signal, operating the MRL relay which lights the MRL lamp and operate the MFC relay. The MFC relay operates the MFC1 and these relays function to release the MTFC and part of the MTC. The RCY lead to the trunk test circuit is also grounded as a signal that the connection has been set.

NO-4 VOLTMETER TESTS ON SUBSCRIBERS LINE

After the marker has released, the test employee is now able to perform various tests to the subscribers line. The test facilities of the voltmeter circuit are also available on the T1 and T2 jacks. Tests such as talking ringing and receiver off-hook tone are available at jacks T1 while tests for foreign battery, ballistic capacity test and continuity tests are available at jack T2. The following description of the tests applied to a subscribers line are functionally diagramed on sheet (N-007).

1. Talking
2. Ringing
3. Voltmeter test for foreign battery
4. Ballistic capacity test
5. Operation with receiver off-hook tone
6. Continuity test

1. TALKING

When jack T1 is patched to a circuit connecting to a subscriber line, ground on the sleeve lead operates SL1, in turn operating S1, and ground from a back contact of L1 lights lamp S. Operation of the T key connects ground and battery to the tip and ring through the windings of L and one side of the repeating coil and T is operated, which connects the telephone circuit to the other side of the repeating coil. Ground on lead G prepares the telephone circuit for talking. If the subscriber receiver is off-hook, L will operate, in turn operating L1, extinguishing lamp S. When the receiver is placed on the hook at the subscriber station, L and L1 releases, lighting lamp S.

2. RINGING

Ringling may be applied to lines connected through jack T1 or the master test frame circuits. Operation of the + key connects ringing current to the ring lead and ground to the tip over leads + and RG of the telephone, key, and lamp circuit. With the + and T1 REV keys operated, ringing current is connected to the tip and ground to the ring. When testing multiparty lines, it may be desirable to apply ringing current to one side of the line without applying ringing ground to the other side if the subscriber receiver is off-hook. Operation of the RG key removes ground by opening the ringing ground leads so that ringing current may be applied to the ring (T1 REV key normal) or tip, (T1 REV key operated). The ringing current then flows through the ring or tip, out to the subscriber ringer, through the ringer and capacitor to earth ground, and through earth ground, duplicated to central office ground.

3. VOLTMETER TEST FOR FOREIGN BATTERY

To test for foreign potential on a line, the FEMF key is operated. This disconnects the test battery from the meter and connects the meter to ground in series with the ring side. If the polarity is such as to give a positive reading it indicates the voltage of a negative battery which is grounded. If there is a negative reading the VM REV key should be operated. This will reverse the meter with respect to the line and indicates a positive battery which is grounded. Tests for foreign grounded battery on the tip side of the line are made as above but the T1 REV or T2 REV key is operated.

4. BALLISTIC CAPACITY TEST

This test is to determine the approximate capacity of the line, the total capacity of a capacitor connected to a line, and to detect an open. To test a line for grounded capacity the G key is operated, then after the needle comes to rest the reverse key (T1 REV or T2 REV key) is operated several times. This causes a deflection proportional to the capacity on the tip side when the reverse key is operated.

5. OPERATION WITH RECEIVER OFF-HOOK TONE

Operation of the ROHT key connects the tip and ring leads to ground and battery through one side of the repeating coil and winding of the L relay which operates over the subscriber loop in the off-hook condition. The operated L relay starts the interrupter and operates L1, which extinguishes the supervisory lamp S, removes ground from the contact of H1, connects lead EC to the winding of H1, operates H through the contacts of the ROHT key and the H1 normal. The H operated, provides an additional holding path for itself through the ROHT key and the H1 normal, connects the T and R leads from the timer circuit to the repeat coil, connects lead LB to the interrupter which flashes lamp ROHT, and grounds lead ST to start the timer and tone generator.

If the subscriber receiver is not restored to the switchhook or the ROHT key is not restored, the tone will be applied and lamp ROTH will flash until the end of cycle when ground over the EC lead operates relay H1.

The H1 operated locks on its secondary winding to ground from the ROHT key operated and releases relay H. Relay H released causes the ROHT lamp to light steadily from ground through the H1 operated. If it is desired to reapply the tone, key ROHT must be released and reoperated to permit H1 to release and reclose the operate path of H.

If while the ROTH key is operated, the subscriber receiver is placed on the switchhook, the loop is opened releasing L, which removes ground from the interrupter start lead and release L1. The L1 released, operates H1 if the timer has not completed its cycle, lights lamp S as a disconnect signal. Relay H1 operated releases relay H and connects a ground through a contact of L1 released to the sleeve lead. This ground holds the S1 and S11 operated and further functions as described in 2.02 and 2.03, except that the ROHT key and lamp is used instead of the H key and lamp.

6. CONTINUITY TEST

The G key is operated to make continuity tests. Lines equipped with a common battery subscriber set, having a capacitor in series with the bell, will show no appreciable permanent deflection of the milliammeter needle unless the receiver is off-hook at the subscriber station. If it is not convenient to have the receiver removed from its cradle, a satisfactory test may be made by operating and releasing the reverse key (T1 REV or T2 REV) several times, quickly. The deflection of the voltmeter is caused by the successive charge and discharge of the capacitor in the subscriber set. If the needle does not return to zero after each operation of the reverse key, there is trouble or leakage on the line. Tests for ground should always precede tests for continuity.

NO-5 TEST FRAME RELEASE

On the subscribers line test the LT and LT1 relays are held operated through a normal KR relay. Operating the release key at any time operates the KR and KR1 relays. These relays lock through an operated TS relay to insure the circuit restores to normal before another test can be started and removes the ground to release the LT and LT1 relays.

The MFCL relay is operated by the KR relay to release the master test frame connector by opening the start battery lead. While the RL may be operated at any time, it is possible that a false trouble record may be produced if it is operated at certain intervals while the marker is still connected.

SECTION N, PART 1

MARKER LINE VERIFICATION
CLASS OF TEST (FIRST STAGE)

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N1 MARKER LINE VERIFICATION CLASS OF TEST - GENERAL

The Marker Line Verification (MLV) class of test is used to verify the cross-connections in the number group and class of service cross-connections in the line link frame for any line and for intercept and similar trunks to which an arbitrary class of service and line number have been assigned.

N1-1 TEST FRAME SET UP WITH CLASS-OF-TEST CHART

The class-of-test table summarizes in tabular form the key(s) and switch(es) used to establish an MLV test on the chart. A single line across all columns is used to separate a particular function with its associated figure, option, key, or switch. The double line within the single lines is used to separate the various options on vintages of master test control frames. The note column and sheet notes are as follows:

- (a) Note 1 indicates that all key(s) or switch(es) must be operated to make a proper test frame set up for this particular class of test.
- (b) Note 2 indicates the key(s) or switch(es) to be used to simulate the trouble record. Refer to simulation tables in SFD-D902, D904, or D906 and their associated colored trouble record card on the opposite pages (D903, D905, or D907) or the simulated table selected. The tables and colored trouble record cards, along with the class of test tables, will assist the maintenance personnel in selecting the proper key(s) or switch(es) to be operated in order to properly simulate the reported trouble condition.
- (c) Note 3 indicates those key(s) or switch(es) used for additional marker tests, but they are not required for the trouble record test or a simulation test.

N1-2 SEQUENCE CHART - MLV CLASS (N104)

The sequence chart for the MLV class of test is a combination of a sequence chart and a flow chart. It is designed to show the main functional interactions between the Master Test Control (MTC) circuit, the Trunk Test (TT) circuit, the Master Test Frame Connector (MTFC) circuit and the Completing Marker (CM). Each double line box represents a particular circuit. The section and part of the SFD which provides full detail for the function is indicated within the box.

The overall progress of an MLV test call is depicted by the flow from one functional box to the next. Within each box are skeletonized sequence chart depiction of the major progress points and information flow. In addition the keys and switches which are set up for the class of call are shown. The primary use of this chart is to show this overall progress of the call with key points of detail. It can be used to isolate a general trouble area if the test call fails in the set up stages.

N1-3 MARKER LINE VERIFICATION CLASS OF TEST - DESCRIPTION

The MLV tests use only special markers since they proceed on a no hunt basis. The assignment information for a line on which cross connections are to be verified is obtained from the line records and set up on master test frame keys/switches. The master test control circuit seizes the marker through the master test frame connector and primes it with the directory number setup. This information is passed to the indicated number group. If the line cross connection in the number group and the line link match the operated keys of the test circuit, the marker line verification relays, FTK, FUK, VGK, HGK, VFK, CSK, and RCK will be operated through the FT(0-5), FU(0-9), VG(0-13), HG(0-9), VF(0-4), CSU(0-9), CST(0-9), CRU(0-9), and RC(1-10) switches or keys operated. When the DCT relay is operated by the marker on the first stage of MLV class of test, it grounds a path through the LV relay operated to the MLV check relays. If all of the check relays are operated, the MLVM relay operates. If any of the check relays are normal, the MLVF relay operates and a trouble recorder card is perforated showing the leads closed by the number group and line link frames.

N1-3.1 MARKER LINE VERIFICATION CLASS OF TEST - PREPARATION

In preparation for marker line verification test, the test employee must operate the keys and switches for the numerical digits of the line to be tested (A-0-9 to D-0-9) the office designation (OA, OAT, OB, OBT), the line location which is assigned to the line (FT, FU, VGU, HG, and VF) the class of service assigned to the line location (CS-T, CS-U), the ringing combination assigned to the line (RCU). The selected special marker to be used to set up the test connection (MTU 0/1) and the MLV key to select MLV class-of-test.

N1-3.2 START OF MLV CLASS OF TEST

Operating the ST key operates the ST relay which operates the class-of-test relay LV through other normal class-of-test keys or switches. With the MLV key operated, the operation of the LV relay lights the MLV lamp,

prepares for recycle of the test circuit for verification of translator line cross-connections and opens the operate path of the LVG relay, but closes its locking path to prevent operation of the LV6 relay after the test started. Releasing the ST key releases the ST relay which removes the shunting ground from the winding of the LV1 relay and allowing it to operate in series with the LV relay. The LV1 relay operated, operates the N1 relay which closes start battery to the master test frame connector MTP lead. The start battery operates a test preference relay (MTP-) which returns ground on the MKS lead. The MKS ground operates the MKT(0 or 1) relay in the connector for the marker selected. The MTFC makes the marker service busy and after verifying that the marker tests normal, operates a test relay in the marker and grounds the TS lead to the MTC circuit.

N1-3.3 OPERATE CONNECTING AND TEST RELAYS

The grounded TS lead from the MTFC operates the Test Start (TS) relay which in turn operates the TS(1-10) relays. At the same time, the TS relay in the MTFC operates the MT test relay in the selected marker. The MT in turn operates other MT- relays in the marker. Some of them will depend on the keys and switches which are operated for the test.

In addition various connecting relays which generally control input information into the marker will operate or will have operated by this time depending on the keys operated. A check path through contacts of these tests and connecting relays provides a ground to operate the MC relay of the MTC when all appropriate relays are operated. The MC in turn operates the MC1-8 relays. These relays cut through many of the leads to the MTC and also control additional connecting relays.

On the MLV class of test, the following test relays are always operated: MT, MT1, MT11, MT13, MT15, MT17, MT18, MT27, MT29, MT56. If the line verified is a PBX line, the MT10, MT19, MT20 will operate through the operated PBXH key. The operated MLV key will operate the LV and LV1 relays. With the KY key operated the K, K1, relays will operate. The KA-KD relays will operate, depending on the A-D digits used for the test.

N1-3.4 INPUT INFORMATION TO MARKER

With the test and connecting relays operated, the marker now has access to the information necessary to set up the connection. The test circuit, simulating a no-hunt incoming trunk and incoming register primes the marker with the numerical digits of the line to be tested and the office code in terms of office A/B, physical or theoretical. The line location and ringing combination is received from the number group and the class of service received from the line link frame. With the digits of the line to be tested primed into the marker, the marker is ready to establish the connections necessary for the MLV class of test.

N1-3.5 SIMULATING TRUNK LINK FRAME OPERATION

In order to satisfy the marker, the functions of an incoming trunk and some of the functions of a trunk link frame are simulated. The keys used on INC class of marker tests are not made effective on MLV class of test. On the first stage of MLV test the KLT relay is operated by the MC5 relay. The operated KLT grounds the FG, TFA, TFB punchings which are cross-connected to the FG and TF punchings to furnish the number of the trunk link frame on which the test frame has a trunk appearance. The F relay of the test circuit operates the FB relay to simulate the FB relay of the trunk link frame. The FB relay operated, grounds the FBK lead to the marker to show the FB relay operated. When the marker applies battery to the BLC lead, the LC relay operates to simulate operation of an LC relay of a trunk link frame. The LC relay operated, grounds the LCK lead to the marker.

N1-3.6 SIMULATING RINGING SWITCH OPERATION

The marker having operated the RC relay grounds the TP' lead to the RSH relay which operates, simulating the operating of a ringing switch hold magnet. When the F relay releases, the operate path of the RSH relay is transferred through continuity contacts to ground on a back contact of the KR relay so the RSH remains operated. The KRS relay is operated by the F relay and closes RS(0-9) leads from the marker to windings of the RS(0-9) relays which simulate ringing switch select magnets. The marker normally grounds the RS0 or RS1 lead and are of the RS(2-9) leads, operating the corresponding relays which lock on secondary windings to ground on the RSH relay. Any of the RS(0-9) relays operated, grounds the RSK lead.

N1-3.7 SIMULATING OPERATION OF JUNCTOR AND LINE HOLD MAGNETS

A. JUNCTOR HOLD MAGNETS

When the marker grounds the TLH lead, the JHM relay operates, simulating the operation of the junctor and trunk hold magnets of the trunk link frame. The JHM relay operated, extends the TLH lead back to the marker on the LLJ lead, simulating closure of the trunk hold magnet sleeve lead. When the FB relay releases, the BST lead is opened and 10-ohm ground locks the JHM relay operated and extends this ground to the LLJ lead, through the LHMA relay operated to the LHMT lead to the marker.

B. LINE HOLD MAGNETS

On the first stage of an MLV class of test, when the marker grounds the LHMT lead the ground is extended to operate the LHM relay which operates the LHMA relay. The operation of the LHM and LHMA relays simulates the operation of a line hold magnet by extending the LHMT lead back to the marker on the LLJ lead and by closing the TTT and TRT leads to the continuity and ground test position of the test circuit.

N1-3.8 MARKER LINE VERIFICATION MATCH/FAILUREA. MATCH

The windings of the marker line verification check relays, FTK, FUK, VFK, HGK, VGK, CSK, CSRK, CSGK, RCK, FNK, TERK, and TBSK have been connected through operated FT(0-5), FU(0-9), VG(0-13), HG(0-9), VF(0-4), CST(0-9), CSU(0-9), RC(1-15) and FNK keys or switches and TERT and TBS switches to the corresponding leads to the marker. If the cross-connections match the operated keys, the marker will supply grounds on leads which will operate the check relays.

When the DCT relay is operated by the marker on the first stage of an MLV class of test, it grounds a path through the LV relay operated to the marker line verification check relays. If all the check relays are operated the MLVM relay operates. If any one of the check relays is normal the MLVF relay operates.

B. FAILURE

The MLVF relay operated, lights the MLVF lamp and operates the REC relay which extends ground to operate the Trouble Recorder Request (TRR) relay and forces the marker to give a trouble record. When the trouble record is completed the marker operates the MOI relay which extends ground to the TDCT lead to operate the DCTL relay in the marker.

N1-3.9 SLEEVE CHECK VERIFICATION

When the RC10 key is operated, operation of the LV relay operates the VER6 to prepare it for the verification of the sleeve cross-connection from the line hold magnet to the number group. The VER6 operated closes leads MT10, MT19 and HTR to signal the marker to extend the S(0-9) leads to the number group, to delay the release of the number group, to open the operate path for the line link frame select magnets and to handle calls on a heavy traffic basis. When the marker connects to the number group and S(0-9) lead has been closed to the NS punching corresponding to the number, the NST relay operates if there is battery on the lead. When the marker operates the LHM relay which simulates a line hold magnet, the LST relay is connected to the actual line hold magnet and, if the line is idle, operates to the line hold magnet battery. If the LST operates, it operates the LI relay, which grounds the LHM lead, shunts down the LST relay, operates the line hold magnet, and extends ground to the number group sleeve and shunts down the NST relay. With both LST and NST normal, the NS relay operates to remove ground from the LHM lead. The NST relay should reoperate closing ground to winding of LST which reoperates to battery from the line hold magnet and in turn operates the SLK relay which locks and lights SLK lamp as a sleeve check indication. If the sleeve and all other cross-connections check, the MLVM lamp is lighted and LVM designation is punched.

N1-4 MARKER RELEASE

When the marker has completed setting up the connection it grounds the DCT lead operating the DCT relay of the MTC which, with the REC key normal, operates the M01 relay to extend the DCT lead back to the marker to cause it to advance.

When the marker grounds the LK2 lead, the LK2 and DIS1 relay of the MTC are operated lighting the LK2 and DIS1 lamps. The marker grounds the MRL lead as a regular release signal, operating the MRL relay which lights the MRL lamp and operate the MFC relay. The MFC relay operates the MFC1 and these relays function to release the MFC and part of the MTC. The RCY lead to the trunk test circuit is also grounded as a signal that the connection has been set.

N1-5 TEST FRAME RELEASE

On the marker line verification class of test the LV and LV1 relays are held operated through a normal KR relay. Operating the release key at any time operates the KR and KR1 relays. Those relays lock through an operated TS relay to insure the circuit restores to normal before another test can be started and remove ground to release the LV and LV1 relays. The MFC1 relay is operated by the KR relay to release the master test frame connector by opening the start battery lead. While the RL may be operated at any time, it is possible that a false trouble record may be produced if it is operated at certain intervals while the marker is still connected.

